JAN 15 1930

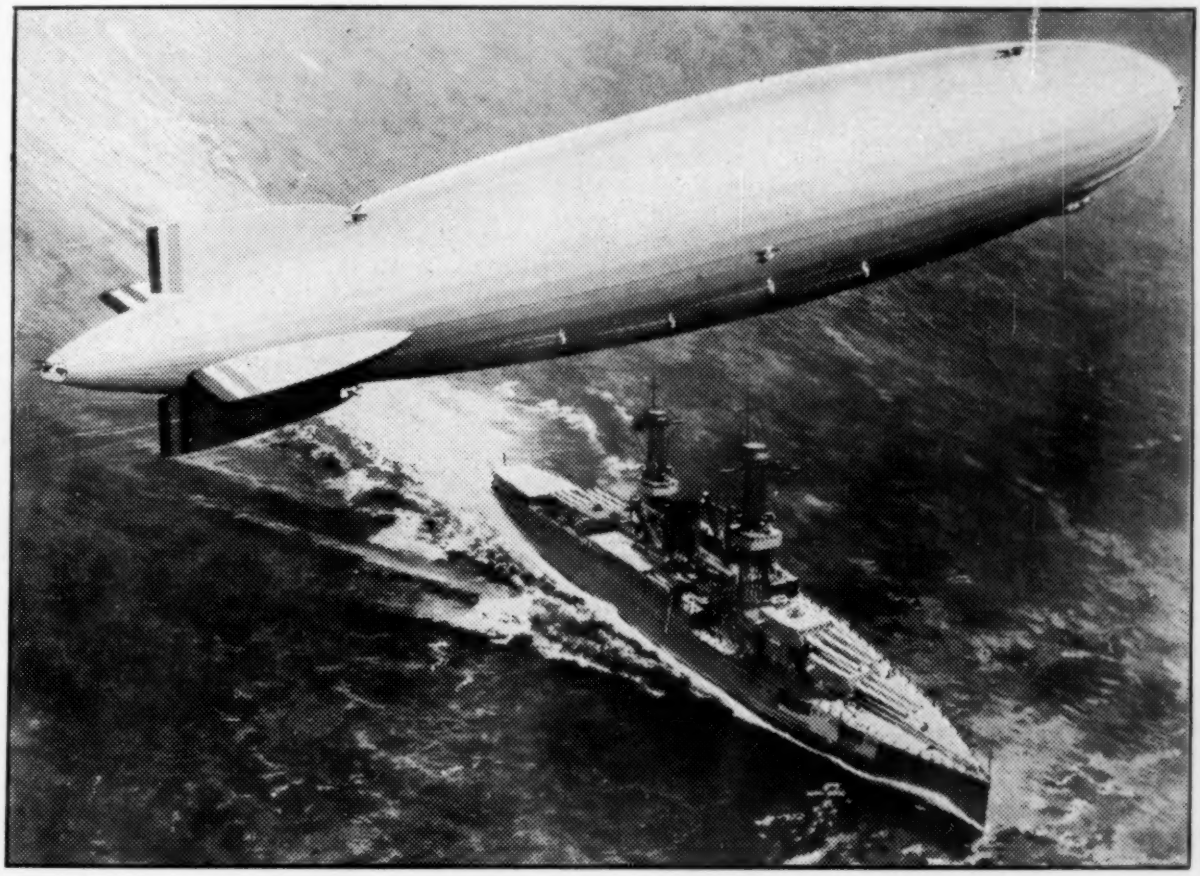
Science News-Letter
Reg. U. S. Pat. Off.
The Weekly Summary of Current Science
A Science Service Publication

Edited by Watson Davis
Vol. XII No. 330

10¢ a copy $5 a year
August 6, 1927

AVIATION

$4,500,000 Dirigible to Give U. S. Air Lead



THE PROPOSED $4,500,000 AIRSHIP OF THE U. S. NAVY, as an artist conceives that it would look when flying with the fleet

By James Stokley

Airplanes have held the limelight lately!

With such a heavier-than-air machine Lindbergh flew to Paris. Also with airplanes, Chamberlain and Levine traveled to Germany; Maitland and Hegenberger to Hawaii, and Byrd and his crew to Ver-sur-Mer.

But when Colonel Lindbergh returned to his native shore and sailed up the Potomac on the Memphis, there circled around above him America's chief example of the other type of air vehicle. This was the Los Angeles, our only rigid airship.

It may not be long, however, before we have another, and still larger dirigible. Congress has authorized the construction of an airship two and a half times as large. It will cost an estimated $4,500,000. On July 1, an appropriation of $200,000 for starting it became available. The Goodyear Tire and Rubber Company, of Akron, Ohio, has been adjudged the winner of a competition for the design for the new craft over a field of thirty-seven. And so the way seems clear for the actual award of the contract for this great ship of the air, and its completion within three years.

Dirigibles Oldest

Despite the fact that the dirigible balloon, or airship, as it is called, to distinguish it from the airplane, has occupied a back seat lately, it is the airplane's big brother. Count Zeppelin built and flew the first of the modern dirigibles in 1900, before the airplane had advanced much further than a dream of the Wright brothers.

(*Just turn the page*)

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New Dirigible

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From this beginning, Germany has gained more experience than any other country in building airships. It was at Friedrichshafen, the Zeppelin works, that our own Los Angeles was built. When that ship was turned over to the United States, it was thought that it would be the last big airship to be built there for a long time. But a year or so ago, the allied restrictions on the size of ships that Germany might build were removed.

The Los Angeles has a capacity of 70,000 cubic meters, or about 2,500,000 cubic feet. Already the Zeppelin works have started the construction of a ship of 100,000 cubic meters capacity. The limit to the size of the new ship is the size of the shed in which it is being constructed. This is the 127th to be started by the firm, and it will be completed within a year.

Natural Gas for Fuel

For the first time, the new German airship will make use of a gas similar to ordinary illuminating gas, as an auxiliary fuel, and until it is burned in the engine, it imposes no additional burden. Gasoline will also be carried, but with the partial use of gas, a longer cruising radius will be possible than if gasoline only were used for fuel, and hydrogen alone for lifting.

Fortunately for us, the United States has a virtual monopoly on helium. This is the non-inflammable gas, obtained from natural gas wells in Texas. The use of helium in American airships has removed one of the chief dangers. The German ship will not be able to use helium, and will depend on hydrogen. There is an advantage, however, in using gas in conjunction with helium in our own airships. Maybe the German idea will be adopted.

One disadvantage of helium is that its lifting capacity is about eight per cent. less than pure hydrogen. American airship experts think that this is more than compensated by the greater safety. But helium and fuel gas both might be used, each in their own compartments. The inflammable fuel gas would be surrounded completely by the bags of helium, so that it would be protected from practically all danger of ignition. In fact, it has been suggested that an inner gas bag full of hydrogen might be surrounded with helium, and so would be gained greater safety than with pure hydrogen. But this is not likely to be adopted in the American ship, though the gas fuel supply surrounded by helium may be. With such a plan the safety would be nearly as great as with helium alone, and far more than with hydrogen alone, or with hydrogen and fuel gas.

Plan South American Line

The new German airship—it will be known as the LZ-127—will not be the only airship effort of that country. Some years ago an airship line from Spain to Argentine was planned, but was finally shelved for lack of funds. Now word comes from abroad that it has been revived with German capital, and a subsidy from the Spanish Government.

The company is called "Transpaeria Espanola." Three passenger airships are to be built at Friedrichshafen. Perhaps the LZ-127 will be used as one of them. The line will run from Seville, Spain, to the vicinity of Buenos Aires. At first the ships will be operated by German crews, but it is provided that after four years the staffs must be 90 per cent. Spanish or Argentine. Such a line would make the trip in about 80 hours, as compared with the 15 days now required for the fastest mail service between Europe and Argentine, or even New York and Argentine.

Another feat that the German airship makers plan with the LZ-127

(*Continued on page* 89)

SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeograph form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—$5.00 a year postpaid. 10 cents a copy. Ten or more copies to same address, 6 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science. Advertising rates furnished on application.

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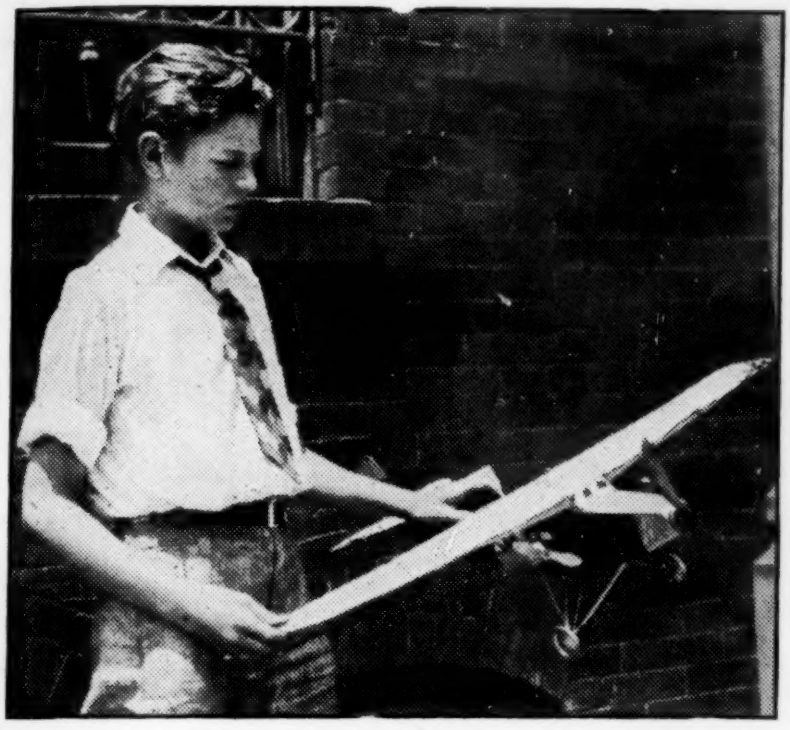
Building and Flying Model Airplanes



A FLYING MODEL OF COMMANDER BYRD'S North Pole airplane and its maker

This week the SCIENCE NEWS-LETTER presents the first of a series of articles to run through the coming weeks which tell how to build and fly model airplanes. These articles are prepared by Paul Edward Garber, in charge of aeronautics at the Smithsonian Institution, and one of the leading authorities on model airplanes.

How to Start

Building and flying your own model airplanes will allow you to play a part in the interesting development of aviation. Whether you are young or old, son or father, daughter or mother, you can easily build and fly your own small-sized aircraft.

You will find it a fascinating sport. The construction of the models is an absorbing occupation for evenings at home. When the model is completed and flown, you will be thrilled by the results.

The first model airplane to be described will be an easily constructed scientific model. You can make it in a few evenings of work by carefully following the directions. The materials will cost only a few dollars.

While building and flying model airplanes is a great sport, it has played an important part in the development of aeronautics. Langley flew models successfully and showed that mechanically propelled flight was possible. The Wrights experimented with gliders and models before they invented the airplane.

Perhaps you through your work with model airplanes can aid in the advancement of aviation. Models are being used today at the great aeronautical laboratories, such as at Langley Field, Va., to solve some of the problems of airplanes.

Tools and Materials Needed

The construction of a model airplane does not require the use of any unusual tools nor material that is hard to obtain. A hand saw, small plane, penknife, ruler, pair of pliers with side cutters, razor blade and a scrap of sandpaper will suffice for the first model to be described.

The wood needed may be obtained from a lumber yard, but probably every boy will be able to save this expense by using a board from a packing box, or cutting up yard sticks, which are often given away by local notion stores. The propellers are cut from small blocks of wood, easily obtainable. The wings are made of wood and wire; the wire should be preferably No. 16 aluminum, which most hardware stores carry. This is best, but ordinary hairpins of the heavier kind can be used. The wings are to be covered with thin tissue paper, or China silk. These are easy to obtain locally, the silk costs about $1.00 a yard; ¼ yard will be enough for the model. Most of the wire fittings can be made from heavy hair pins, but the propeller shafts should be stiffer wire, such as hat pins.

The propellers are powered with rubber. The best form consists of what is known as rubber thread, and is obtainable from rubber companies and model supply houses. A substitute may be made by linking together in form of a chain, long rubber bands, which all drug stores carry. In every instance the material which is lightest and strongest should be used. The actual sizes of material required will be specified in connection with the construction of parts.

Making the Frame

When model airplanes were first made by boys, shortly after the first flight by man, made by the Wright brothers in 1903, the models resembled full sized machines, and like their originals were heavy and flew but short distances. Most of the models were flown indoors because they did not require much room. They were often hard to fly outside where the slightest wind would unbalance them. As the large machines were improved, however, the models too became more stable and capable of longer flights. Gradually outdoor flights became common, and soon it was necessary to find large fields to accommodate the longer trips made by the better models. Gradually two kinds of model airplanes developed, one class known as scale models being copies of the large machines, and the other class

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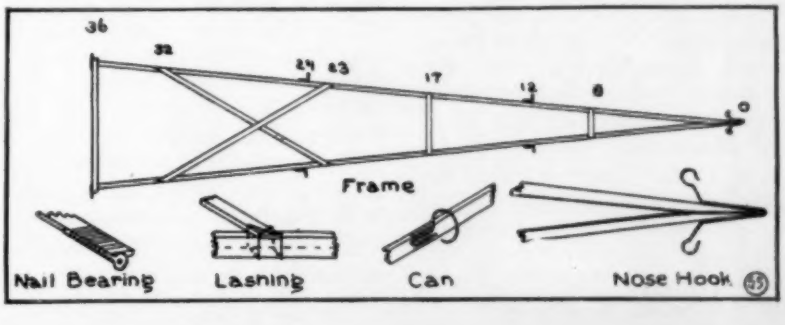


Model Airplanes

(*Continued from page* 83)

known as scientific models which consisted of the bare essentials for flight, namely a frame, propellers and wings. The scientific models are easiest to build and make the longest flights. Whereas the first model airplanes flew but fifty or sixty feet, the record today is over a mile, with a duration of more than ten minutes.

In these first articles the writer will describe the construction of a scientific model made in the easiest manner from the simplest materials. Although elementary in design and construction it nevertheless embodies correct principles and if made correctly of light materials it should fly at least five hundred feet and remain in the air half a minute.

Nowadays for purposes of identification the Department of Commerce requires individual markings on aircraft, similar to automobile licenses. For instance, Lindbergh's famous "Spirit of St. Louis" is identified by the symbol, "N-X-211." We, too, will follow this custom and call this first model the "S-S-1." After you have built your model you may want to give it your own symbol.

The first part of the "S-S-1" which we will make will be the frame, which supports the wings and power plant. The corresponding part on man-carrying planes is called the "fuselage." For this we will require the following material:

2 pine sticks 36" x ⅜" x ⅛"
1 pine stick 36" x ¼" x 1/16"
10" of small strong wire
1 hatpin
2 small nails.
Glue and thread.

The two large sticks are to be made smooth with sandpaper, and then cut at one end in a long wedge, as shown in the detail drawing. This wedge must be such that the open ends of the "V" formed will be 7" apart. When this wedge has been cut glue is put on the inside faces of the wedge and the pieces stuck together.

Ordinary glue will do, but a product named Ambroid is better for our purpose. It is stronger, dries quicker and is waterproof. Most hardware stores and sporting goods stores carry it. After joining the wedge the nose hook shown in the drawing should be made of small stiff wire, and placed over the point of the frame, after which it is bound on, thus strengthening this joint.

The other end of the frame next occupies our attention. It is the place for the propellers, so we will make the bearings for them. Take the two nails, flatten one end and hammer the rest to produce a slightly flattened side. In the flattened end of each drill a hole large enough for the hatpin to pass through. These holes can be drilled with a hand drill. If you do not have such a tool the nearest garage will drill them for you. Tell them to use a number 52 drill, or a 1/16" drill. This size is correct for most hatpins. When completed bind these bearings to the ends of a piece of the ¼" wood, 7¾" long as shown in the detail drawing. Lash the brace to the open ends of the frame as shown.

Another detail drawing shows how to make a strong lashing. Pass the thread in the direction shown by the lines, make several turns, then tie. Use Ambroid in this joint and spread a little over the thread when finished. Next form an "X" brace out of two pieces of the ¼" wood and lash it in place. The other braces are next put in. At the top of the drawing several numbers are shown. These represent numbers of inches away from the point of the model. If you will lay a yardstick or other ruler along the frame with the beginning at the point, you can put a mark on the frame where each of the numbers are and thus mark out the correct places for all of the parts. Do this on each side and you will get your braces true. In lashing on these parts make your work strong and neat. Do not have heavy coarse joints. When the Ambroid has dried cut away protruding parts of the braces which extend beyond the sides.

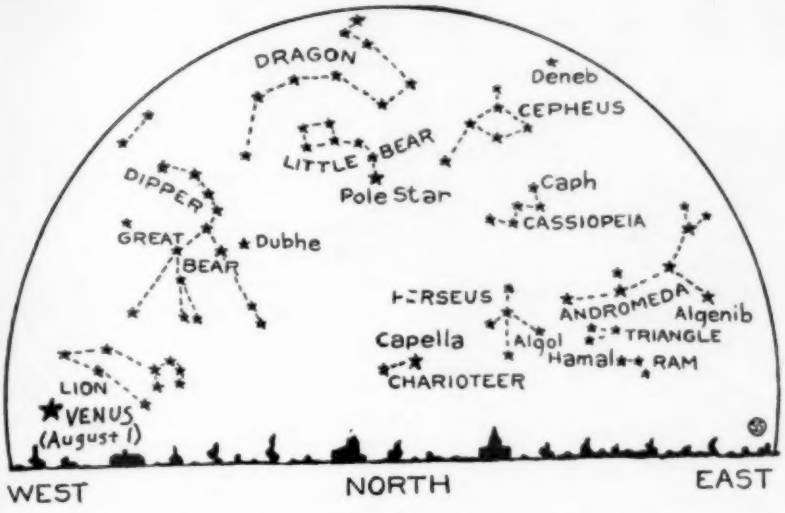
In the detail drawings a wire fitting is shown called a "can." These little fittings are very useful on models for they distribute the pull of the rubbers and keep the frame from getting bowed. They serve the same purpose as do the agate rings on fishing rods. Four cans are made from wire to the shape shown, and they are lashed to the sides at points 12 and 24. Finally hold the frame up and sight with the eye from the nose hook to the nail bearings. Make sure that the sides are true and that the cans line up with the hook and bearing holes. This completes the frame. Hang it up where it will not get damaged or distorted.

Next week we will make the propellers for this model.

MEMORANDUM

This blank space serves a dual purpose. It allows you to clip out the article on the reverse of this page without destroying any other article. It can also be used for notes and the recording of your own observations.

Three Planets Decorate August Evening Skies



For the first time in many months, three bright planets now appear in the evening sky. Venus has been with us for some time, shining brilliantly in the west, and this month it reaches its maximum brightness. Saturn first appeared in the evening sky last month and now it is easily observed all evening, while Jupiter, largest of all our fellow planets in the Solar System, rises about 9:00 p. m. and is visible the rest of the night.

Venus Brightest

Brighter than any star or planet, or, in fact, than any object in the sky except the sun and moon, is the planet Venus. On the second of July it reached the farthest distance east of the sun, and then was highest in the western evening sky. Since that date it has been approaching the sun again, and setting a little earlier each evening, but as it has still been approaching closer to the earth, its brightness has been increasing. Finally on August 5 it reached its maximum brightness, when it was of the -4.2 magnitude, as astronomers indicate it, or about 15 times as bright as the brightest star, Sirius. At that date, it appeared through the telescope like the crescent moon, four days after new moon.

Then, after August 5, the planet began to diminish in brightness, at the same time continuing to approach the sun. By the end of the month it is so close to the sun that it sets less than an hour after it. Then it will appear through the telescope as a very narrow crescent, and because the crescent is so narrow it will send much less light to the earth than it does in these days of early August. On September 10, it will be in line with the earth and the sun, and therefore, invisible, and then, after a few weeks, will appear as a morning star.

Nowadays, of course, we realize just how the orbit of Venus around the sun is within that of the earth, and how we see it sometimes to the east of the sun, and sometimes to the west. When to the east, it sets later than the sun, and so is in the evening sky, and when it is to the west, it rises before it, and becomes a morning star, visible just before sunrise.

Ancients Thought it Two Planets

To the ancient Greeks, however, this was not clear, and they supposed that there were two planets. When seen in the evening sky, they called it Hesperus, and when seen in the morning, it was Phosphorus. Mercury, the other of the two planets nearer the sun than the earth, was likewise supposed to be two bodies. They called it Mercury when it was an evening star, and Apollo when seen in the early morning.

Galileo, who first used the telescope on the stars, discovered the fact that Venus underwent a complete series of phases from crescent to full and back to crescent again, like the moon. But one of the earliest astronomers to study Venus in detail was another Italian, Francesco Bianchini. In a magnificent folio volume, first published at Rome in 1728, he describes his observations.

Though Bianchini had a telescope a hundred or more feet long, it was far inferior to modern instruments and most of his observations have never been confirmed. For instance, he thought that he saw all manner of markings, which he supposed to be continents, on the planet. The most conspicuous of these he named after the king of Lusitania, now Portugal, who seems to have been a particular friend of his. He prepared an elaborate map of the surface of Venus, showing these continents as well as other smaller ones, which he named after other nobles of the time and after astronomers.

Observing these "markings" he then tried to observe the rotation of Venus, as the same markings were carried around again, and came to the conclusion that the planet turned on its axis once in 24 1/3 days. However, with the most modern instruments, astronomers have not been able to find out just what the rotation period of Venus is, though it is almost certainly longer than that of

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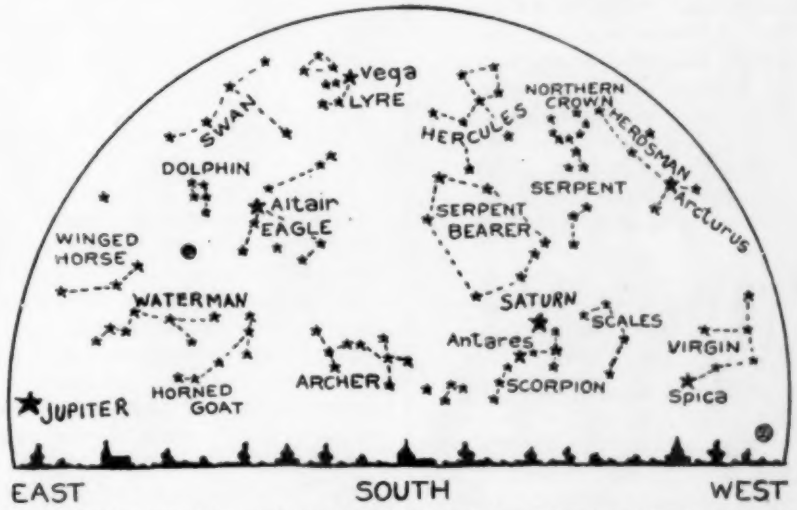

HOLD THESE MAPS IN FRONT OF YOU and face North or South. You then see the stars as they appear on a clear August evening

August Evening Skies

(*Continued from page* 85)

any other planet except Mercury, and is probably nearer to Bianchini's estimate than to a later one of a little less than 24 hours.

Jupiter the Giant Planet

In the southeastern sky, late these August evenings, is another bright planet, brighter than anything in the sky except Venus, the moon and Sun. This is Jupiter, giant of the solar system, which unlike Venus, can at times, as now, be seen all night. It is one of the so-called major planets, for these attendant bodies of the solar system are divided into two classes. The earth, together with Venus, Mercury and Mars, are the minor planets, which are pretty small fry among the planets. We at least have the honor of living on the largest of this quartet, for the earth is 7917.8 miles in average diameter, compared to 7575 miles for Venus, 4216 for Mars, and 3009 for Mercury.

Jupiter, Saturn, Uranus and Neptune, however, belong to the family of major planets. Jupiter is the largest of the lot, with a diameter of 86,728 miles, Saturn is 72,430, Neptune 32,932 and Uranus 30,878. Jupiter is the nearest to us of these planets. It is now about 400,000,000 miles away.

But though Jupiter is larger than all the other planets of the Solar System put together, it rotates faster than any of them, for it turns on its axis once in about 9 hours and 55 minutes. This rapid rotation causes one effect which is quite noticeable when Jupiter is viewed through the telescope. Instead of appearing round, like a tennis ball, it is oblate, or shaped like a door knob. This is due to the centrifugal force. The rapid turning tends to hurl the material at the Jovian equator away from the center, with the result that there is a very appreciable "equatorial bulge."

Belts Most Conspicuous

But the shape is not what first strikes the eye of the telescopic observer of Jupiter. The most conspicuous feature is the system of belts. With a small telescope magnifying only 60 diameters the planet appears as large as the moon does to the naked eye. And with a powerful telescope, magnifying several hundred diameters, a wealth of detail is apparent, with reds, browns and greens to give variety of color. The belts themselves are like the zones marked on a map of the earth, and other details can often be seen in them.

However, since the finer details are constantly changing, it seems certain that the surface of Jupiter that we see is not solid, but probably gaseous. Clouds of different colors make up the belts and the markings within them. But whether there is any solid surface underneath has never been definitely ascertained. Prof. Harold Jeffreys, a famous English astronomer, has suggested that the planet may have a core of solid rock, surrounded by a layer of ice, and that by the atmosphere. But other astronomers have supposed that the planet is still very hot, and so just what it does consist of is still a problem for science to discover.

Besides being the biggest planet, Jupiter is also one of the best equipped as far as moons go. It has nine satellites, more than any other except Saturn, which is provided with ten. Four of them are large enough to be seen with a good pair of binoculars, if the instrument is steadily held. These were found also by Galileo, on January 7 and 8, 1610. This was really the first astronomical "discovery"—that is, the first time that celestial objects had been seen that had previously been invisible because of the lack of proper instruments. The largest of these moons is 3,350 miles in diameter, so that it would make a respectable minor planet itself, but its proximity to Jupiter dwarfs it, like its brothers, into relative insignificance.

The other satellites were later discoveries, the last one having been found as recently as July, 1914, by Dr. S. B. Nicholson, now at the Mt. Wilson Observatory in California, but then at the Lick Observatory in the same state. Like so many discoveries, he found it by accident. He was taking a photograph of one of the other satellites, and when he developed and examined the plate, he found a moon that had never been noticed. This put the young American astronomer into the exclusive group of moon discoverers, which was founded by Galileo.

The August Stars

The stars in August are indicated on the maps. Almost overhead is the bright Vega, in the constellation of Lyra, the lyre. Northeast of Lyra is Deneb, in Cygnus, the swan. This group is also called the Northern Cross, and forms a more perfect cross than the more noted Southern Cross. The northern one, however, is made of fainter stars. Deneb marks the swan's tail, the bottom of the cross his neck and head, and the cross pieces his wings. And then, to the southeast of Vega is the bright Altair, in Aquila, the eagle. These three stars—Vega, Altair and Deneb—form a huge right triangle which is a conspicuous feature of the late summer sky, and a figure that the star gazer who wants to know the inhabitants of the night heavens would do well to learn.

Science News-Letter, August 6, 1927

Diving machines are to be introduced into the Tahiti Society Islands for pearl gathering.

Dead leaves of birch, maple and other hardwood trees absorb water up to 220 times their weight.

The great barrier of ice around the South Pole is receding at the rate of about 40 miles a century.

In a recent race between an Australian race horse and a kangaroo, the latter far outdistanced the horse.

Marco Polo, who traveled to China in the thirteenth century, reported that paper money was in use there.

Make Friends
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Capital little guide books to the stars. They contain charts of the heavens for the different months and simple readable descriptions of how to learn to know these nightly neighbors of ours. Excellent fun for club girls. The clear nights of autumn and winter are fine for star gazing parties.

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Unto The Fourth Generation

The ground in front of us was dotted with small, hard, round pellets. One of the girls in the group insisted that they were lumps from the branch-ends of a pignut tree overhead. After quite a discussion and argument over the whys and wherefores we decided to find out where they came from. By climbing around and skinning our shins we discovered three mammoth green caterpillars in a wild cherry tree instead of a pignut. Quite thrilled, we carefully carried them home, much to the disgust of everyone. In less than two weeks of feeding on more wild cherry the three larvae of the *Samia Cecropia* moth curled up and went to sleep in large silken cocoons for the winter. The following spring only one emerged—a large quivering female. We kept our prize in a box for a day until her wings were rigid and then put her out on a tree in front of the camp-house. We thought we were freeing the *Cecropia* moth, as in truth happened, for we never saw her again. However, about four weeks later one of the girls discovered a green "worm" in a viburnum not far from where the female had been released. Looking down at the shrub there was no evidence of more than just the one, but when we happened to stoop over and look up we counted a family of no less than twenty-eight half grown larvae of the *Samia Cecropia.* We have always felt justifiably certain that these were the second generation of the moth we had freed, because up to that time no *Cecropia* moths had been captured on our camp site. Further proof was offered when we found about thirty egg shells only a few inches from where the female was placed. These were raised and the cocoons taken to Montclair for the winter. In the spring of 1927 fifteen males and twelve females emerged. On May 25 a male and female mated, producing about one hundred eggs. About seventy of them hatched in June. We put the little black fellows in a breeding cage made of a lantern chimney and a flower pot, where they thrived on daily meals of their favorite food.

On June 20 they were destined to a ride on New York's stuffy subways and thence to Camp Edith Macy near Briarcliff Manor, N. Y. Their arrival caused quite some excitement and many exclamations of fat slimy

By Carol Cady

green worms! and who would be buggy enough to bring such things as those to camp! In spite of the temporary opposition, which gradually changed to awe and finally to a desire for possession of the worms, they grew to a size of three inches and almost ate a wild cherry tree out of house and home. By that time there remained twenty-seven members of the family, the deaths being caused mainly by drowning and failure to take off their old suits of clothes. On June 28 another brood of little black fellows, first cousins by actual relation, hatched. Everybody was greatly excited watching the larvae scratch and wriggle out of their shells.

On leaving Macy a few of the "bugs" were left behind, so that we only had sixteen larvae three inches long, and about ten of their young cousins. Three large ones died on the journey from Macy to Camp Madeleine Mulford, where the remaining thirteen were to continue their quest for more wild cherry.

It is now only July 19, the big fellows have one more molting before they will be ready to curl up for the winter of 1927. Next spring some of them will hatch and mate, thus carrying on their family traditions with us for four generations.

—By CARLEEN MALEY.

Science News-Letter, August 6, 1927

The material on this page is furnished by the Coordinating Council on Nature Activities.

All but four states collect a tax on gasoline sold within their borders and use it for street and road purposes.

August Nature Calendar

This "Nature Calendar" is prepared monthly for Camp Fire Girls by the Cleveland Museum of Natural History. It is written by Dorothy A. Treat, Assistant to Mr. Harold Madison, Curator of Education at the Museum.

Black-spored "inky-caps" and the "pink bottoms," *Agaricus campestris* of the fields, open the season of mushroom delicacies.

Purple elderberries, ripening along the roadsides, are much enjoyed by the robins who crunch them between their mandibles and find the red flesh and crimson juice very pleasant.

In August, a good place to see birds is in the marsh. Here, large flocks of them, particularly the "redwings" and bobolinks, are feeding on the ripening rice grass.

Yellows and lavenders dominate the fields and open spaces. Goldenrods and purple asters brighten the roadsides. Tall sunflowers and pinkish lavender Joe-Pye weeds line the river banks.

Two kinds of swellings called galls can be found on goldenrod stems. If opened with a knife, the spindle-shaped ones show a fat little moth caterpillar feeding within, the ball-shaped ones, the larva of a fly.

Now is the time to observe that indicator of good corn country, the pickle lettuce, and see why it is sometimes called compass plant. During hot dry days of late summer the leaves twist and point very nearly north and south.

Crimson Oswego tea and cardinal flowers are blooming in wet shady places, soon to be vacated by the scarlet tanagers who are donning their dull green coats and preparing to start south.

Science News-Letter, August 6, 1927

The giant octopus sometimes measures 18 feet from tip to tip of its long arms.

Dry ice, made of frozen carbon dioxide gas, makes it possible to send ice cream by air.

The United States is the world's largest producer and consumer of prepared medicines.

Many of the fishes have greater power to change color than the changeable chameleon.

Glass windows were used in wealthy homes of Pompeii, the city destroyed by Vesuvius in 79 A. D.

Nature Coordination

Realizing the need for a national program that would coordinate the nature activities of national groups working with young people, the American Museum of Natural History invited these volunteer organizations to form a council to be known as the Coordinating Council on Nature Activities for the purpose of teaching the growing generation, through nature activities, the value of all wild life and natural resources and their conservation.

The various organizations represented are as follows:

American Museum of Natural History, American Natural Study Society, Boy Scouts of America, Camp Directors Association, Camp Fire Girls, Inc., Girl Scouts, Inc., Pioneer Youth of America, Playground and Recreation Association, Woodcraft League of America.

Science News-Letter, August 6, 1927

Daily weather observations are made at about 5,000 places in the United States and its possessions.

It has been estimated that the ton weight of insects in Africa is greater than the weight of all the mammals.

A trans-Atlantic plane capable of carrying 40 persons would weigh about 15 tons loaded, and would cost about $100,000, Guiseppe Bellanca estimates.

Marking the names of towns on the roofs of the tallest buildings as a guide to aviators has been suggested as a practical tribute to Col. Charles Lindbergh.

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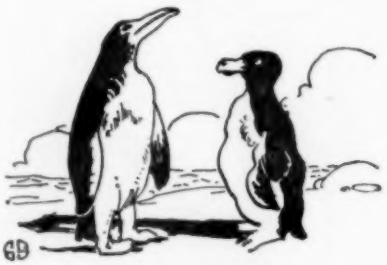
BIOLOGY

NATURE RAMBLINGS

By Frank Thone



Birds of the Ice

Dog-days here—but think how nice and cool the penguin has it. He lives in the Antarctic seas (the nearer he can get to the South Pole the better he likes it), and July and August are midwinter months in the southern hemisphere. With a slippery rock to roost on, and plenty of fish in the sea for the taking, he asks nothing more of life.

He is an extreme example of what a single-track evolutionary habit can do, for he has lost all the long feathers from his wings, and can use his abridged pinions only as swimming-flippers. Indeed, his wings have an astonishing resemblance, at least superficially, to the flippers of a seal, which are also forelimbs of an originally non-aquatic animal that has taken to a seafaring life.

The northern hemisphere once had a flipper-bird of its own, too, but the ruthless hunting of the first comers along the Newfoundland and Labrador coasts exterminated the poor thing. This was the great auk, the last of whose flocks disappeared during the nineteenth century. The great auk was never a true ice-bird, for it was found little if at all north of the Arctic circle; but it lived in such stormy waters that only the stout ships of the whalers and fishermen could navigate them, so that it got the reputation of being an even hardier fowl than it was. Its inability to fly was its undoing, for its magnificent swimming and diving accomplishments could not carry it out of the reach of white men with firearms.

The great auk is survived by a lesser relative that is still fairly abundant, the razor-billed auk. This bird also uses its wings in swimming, but has retained the power of swift flight, so that the hunters have not yet succeeded in wiping it out.

Science News-Letter, August 6, 1927

News-Letter Features

Born over four years ago of the demand and interest of those individuals who had caught a glimpse of *Science Service's* news reports to newspapers, the Science News-Letter has since proved interesting to laymen, scientists, students, teachers and children.

Into the pages of the News-Letter are fed the cream of *Science Service's* output directed at the newspapers of the world. To this is added material especially prepared.

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The classics of science and striking passages from current books, addresses and periodicals are carefully selected and published.

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Regular articles tell of the happenings in the *skies* and in the great *outdoors.*

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Great care is taken to keep its editorial content not only *interesting* but *accurate* as to fact and implication.

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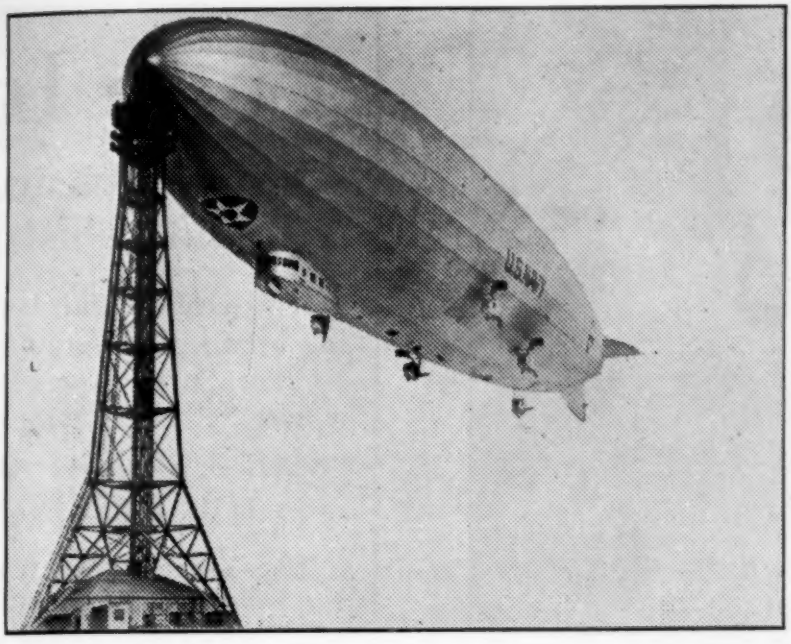
Science News-Letter, August 6, 1927

An air mail service between Madrid, Lisbon and Seville, Spain, has been started.

Many of the early migrations of men were to escape regions shaken by earthquakes.

A swarm of locusts that plagued Algeria in 1866 was estimated to weigh 50,000 tons.



THE LOS ANGELES, at a mooring mast. The development of these mooring masts, which obviate the dangerous and difficult process of putting an airship into its hangar, has been a great forward step towards the commercial use of dirigibles

New Dirigible

(*Continued from page* 82)

is the first airship circumnavigation of the globe. According to Dr. Hugo Eckener, who piloted the Los Angeles from Friedrichshafen to Lakehurst, the new ship will be used next summer in a flight around the world in three or four great hops and a flying time of about 300 hours. Before this, it is planned, however, to make several flights back and forth across the Atlantic.

England's Plans

England, also, is interested in airships. After the war, when economy was the watchword, she practically abandoned airships, but now her interest has been reawakened. Two ships of 5,000,000 cubic feet capacity are now being constructed. One is to be finished within a year, the other within eighteen months. One is being built by the Air Ministry, the other by the Vickers works. While they are supposed to be passenger ships, it is hardly to be doubted that in the event of war they would be used to perform much the same function as the ships of a merchant marine. At the imperial conference held in London last fall, attended by representatives from all the dominions and colonies, some facts about the airships were revealed.

These ships will comfortably accommodate 100 passengers each, according to the official published memorandum of the British Air Ministry. This will be in addition to baggage, and 10 tons of mail. There will be sleeping cabins with two or four berths, promenade decks, lounges and smoking room; and dining rooms with seats for 50 persons at a time. A suggested layout of these accommodations shows an arrangement very similar to that on a steamship. It is pointed out, however, that an airship is much more comfortable than a steamer: it flies with less rolling and pitching than a vessel, and in the British airships, vibration from the engines will be reduced to a minimum, because the motors will be carried in separate cars slung away from the main structure.

Line to India

It is the belief of British air officials, and their views are shared in the United States and other countries as well, that the airship is particularly adapted for long distance flights, comparable with those now made by ocean liners, or through trains. The chief field of usefulness of the airplane is in shorter flights.

In order to fully test its possibilities, Sir Samuel Hoare, the British Secretary of State for Air, has announced that the first of the new ships will be employed in a regular service between India and England. When this service has been carried out long enough to test airships under practical conditions, the ship will then be used for a series of demonstration flights to various parts of the British empire.

As a preparation for the India line, a new mooring mast has been constructed at Cardington, which will be the British terminus. A refueling station with a mooring mast has also been constructed at Ismailia, Egypt, a point about midway in the route. The Indian end will be at Karachi, on a site provided by the Indian Government.

Special weather observations along the entire length of the proposed route have been made to see how the regularity of the service might be affected, and at which time of year they would be safest. When all the meteorological conditions are known, it is possible to avoid the storms. Three tentative routes on the England-Egypt stage of the India route has been laid out, so that the best one can be decided just before each flight. And then, as the pilot of the airship will be in constant touch by radio with the ground weather stations, his route can be adjusted even in flight.

New American Airship

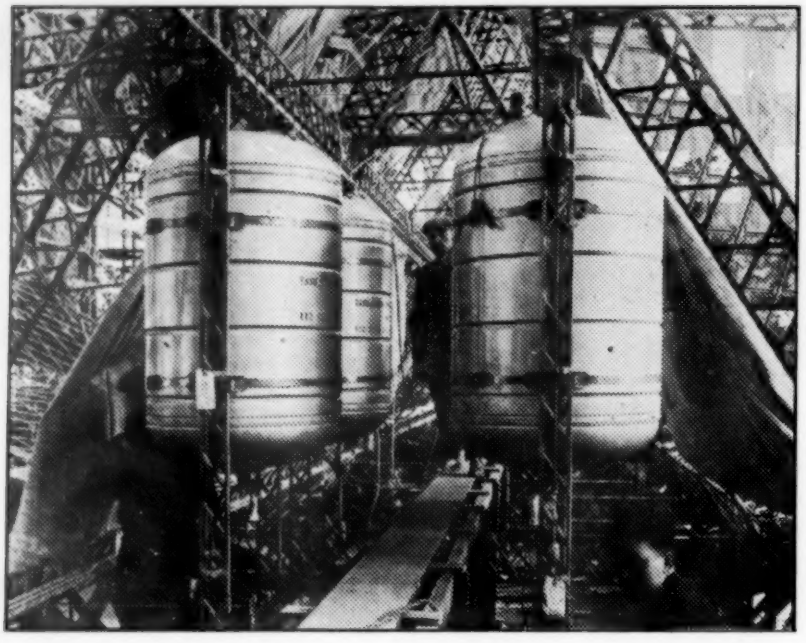
Though England and Germany are putting forth their strongest efforts to gain and hold airship supremacy, the United States also has a chance to gain it by the construction of the $4,500,000 dirigible that Congress has authorized. As the ship is authorized, as a sum of money for its start has been appropriated and become available, and as the design of the ship has been decided on, the way to this great ship now seems clear.

The ill-fated Shenandoah was the only American home-built big rigid airship. Though it was lost, its use gave aviation engineers much needed experience. The new ship is intended to replace the Shenandoah, but new features will be incorporated in the design.

Most noticeable to the layman is that the new ship will be much more corpulent than the slender Shenandoah. The Los Angeles was thicker than its sister, and the new ship will be even thicker than that. It will only be about 15 per cent. longer than the Los Angeles, but about 50 per cent. thicker. This will make for greater strength.

An improvement adopted in the design of the Los Angeles will be carried further in the new airship by completely eliminating hanging cars. In the Shenandoah, the pilot's cabin, as well as the cars containing the engines, were suspended from the hull. In the Los Angeles, the pilot's car was made an integral part of the ship, but the engines were left suspended. In the new ship, the engines also will

(*Just turn the page*)



GASOLINE TANKS IN THE SHENANDOAH. With the use of fuel gas in new airships, weightless gas bags will largely replace these metal tanks

New Dirigible

(Continued from page 89)

be within the hull, and only the propellors will project. In this connection, it is recalled that the only men whose lives were lost in the wreck of the Shenandoah were those not within the hull.

The engines of the new craft will give a total of 4,800 horsepower. These will carry it at a speed of 90 miles an hour, and it will be able to fly from 5000 to 8000 miles with a full military load, without refueling. The ship will have two covers, one within for the gas, and another outside for protection from the weather. The metal framework will be between the two, so that any part of the ship will be accessible, for minor repairs or examination, even in flight. It will be fitted with tilting propellers, a great aid in suddenly forcing the ship up or down. It will also be capable of carrying four to six airplanes, which can take off from it, or be taken on again while in flight. When not in use, the planes will be drawn up into the hull, so as not to interfere with the ship's lines.

When this ship is completed, America will once more be at the forefront of rigid airship development, as it is now in the field of heavier-than-air craft. True, the airship is not primarily passenger in character, like the ones being built in Germany and England. The $4.500,-000 ship is frankly a naval craft, and will be armed with machine guns, and light cannon. But with the example of such a ship, the world's largest, being built in an American factory, the development of a commercial airship industry in the United States, and American airship lines stretching to all parts of the globe, would be but the next step.

Science News-Letter, August 6, 1927

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EVOLUTION—GENETICS

X-Rays Imperil Heredity

X-ray treatments of certain types may be laying a terrible curse on the descendants of patients now receiving them. Horrible defects and malformations may be visited upon their children far beyond the scriptural third and fourth generations.

Yet the same kind of X-ray treatments can speed up a hundred-fold the rate of the controlled evolutionary processes used by breeders to produce improved kinds of animals and plants.

This sensational paradox of science may be looked to for hitherto little suspected perils in the field of medicine and for revolutionary effects in agriculture, if the findings made by Prof. H. J. Muller of the University of Texas, on tiny fruit flies, hold true for other living things.

It has been proved in his experiments that in the germ-cells of the flies, X-rays affect the little particles responsible for heredity in much the same way as a shot-gun fired at a pile of pebbles would affect the pebbles. The hereditary particles become permanently transformed in all sorts of unexpected ways and the sudden changes known as "mutations" are produced in them.

Not all of them mutate at once, Prof. Muller explains, but here one, there another, they change in quite a random fashion. Sometimes also they are dislodged into new arrangements. Since these hereditary particles, which are known as "genes," are handed down from parent to offspring, and determine the characteristics of the next and later generations, all kinds of new traits are likely to arise among a group of offspring or grand-offspring from parents that were treated with X-rays. These new traits are permanent, as they are inherited by succeeding generations.

It has long been known that such mutations occasionally happen without X-ray treatment, and so give a chance for the breeder to improve his stock, by breeding from animals that have desirable mutations. In the same way in nature, the "survival of the fittest" mutations is thought to have brought about evolution. But the mutations that happen without X-ray treatment are exceedingly rare and it has never previously been found possible to make them occur oftener. That is why animal and plant improvement has been so slow, and why it has been necessary to raise countless thousands of ordinary individuals for each advantageous mutation that has turned up.

Now, if mutations can be produced at will, all this will be changed, and the production of new plant and animal varieties will go as far forward in ten years as it formerly did in a century.

But mutations, whether produced by nature or by X-rays, are bad oftener than they are good. The plant or animal breeder simply throws away a hundred bad new varieties and keeps one good one. It is here that Dr. Muller sounds his warning as regards human beings. We do not make a habit of throwing away undesirable babies, and anything that might tend to produce a crop of unfortunate human freaks or cripples should be used on human beings with extreme caution. This does not mean, he emphasizes, that all X-ray examinations or treatments are dangerous, but only those that expose the reproductive organs to prolonged or intense doses of the rays.

In particular, X-ray treatments applied for the purpose of deliberately producing temporary sterility are frowned upon. Five years ago, at the London meeting of the Birth Control Congress, Dr. C. C. Little, then of the Department of Genetics of the Carnegie Institution of Washington, and now president of the University of Michigan, characterized the practice as "little short of a calamity." At that time Dr. Little described experiments of his own on rats which had been subjected to this treatment. Young born to them subsequently appeared to be normal, but the third and following generations were marred by the frequent occurrence of repulsive physical defects and monstrosities.

Important as the possible human and practical consequences of his study may be, Dr. Muller states that the work so far constitutes only a beginning of the possibilities that lie along this line.

To scientists, he says, the most interesting aspect of the work will probably be the insight which it may give us into the causes of evolution and into the nature of the genes themselves. In fact, certain conclusions regarding the structure of genes have been drawn from the work that has already been done. These will be presented by Dr. Muller in a technical paper before the International Genetics Congress, to be held in Berlin this September.

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HYGIENE

Fight Heat Deaths

The New York City Health Department is fighting the annual ravages of the hot weather among the babies shut in by the brick walls of crowded tenements. As many mothers know only too well, young children cannot stand extremes of heat or cold nearly as well as adults can. So with the arrival of summer the health departments of all large cities look sharp where the babies are concerned.

The inability of babies to cope with extremes of temperature Dr. J. L. Blumenthal, director of the Bureau of Child Hygiene of the Health Department, explains by the fact that their systems are not yet adjusted to the rigors of the life into which they have been born. This adjustment is part of the process of growing up. To some extent it concerns the sympathetic nervous system, a network of white nerve fibers connected with the spine and differentiated from the nerves by which we feel and move. The sympathetic nervous system controls such involuntary processes as digestion. In babies the balance of these processes and systems is extremely delicate and easily upset by varying external conditions.

Further, babies are more susceptible to infection, according to Dr. Blumenthal, because they have more surface area than adults in proportion to their size and many infections enter through the skin.

To meet the needs of the babies as the mercury rises New York City enlarged the facilities of its Baby Health Stations. These stations maintain clinics in congested districts throughout the city. With the closing of the schools physicians who during the winter supervise the health of the school children were assigned to these clinics to hold office hours in addition to the regular winter clinic hours. Thus many more babies may be taken care of.

Science News-Letter, August 6, 1927

A Danish invention makes it possible to transfer photographs to porcelain.

Paris traffic policemen must learn how to drive automobiles in order to direct traffic intelligently, a new police regulation has decreed.

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First Glances at New Books

THE STARS—Harlow Shapley—*Amer. Library Assn.* ($.35). The distinguished director of the Harvard College Observatory is the author of this latest pamphlet in the American Library Association's "Reading with a Purpose" series. Like the others it is aimed to guide the layman in reading up on the subject, astronomy in this case. "If the reader," he says, ". . . . . hopes to become proficient in the black arts that deal with astral influences and the rest of the astrological flubdub, ... he should sadly withdraw; any good compendium of hocus-pocus will give him the more important tricks of horoscope casting."

Science News-Letter, August 6, 1927

THE LIFE OF DARWIN—Leonard Huxley—*Greenberg* ($1.75). As the son of Darwin's close friend and chiefest champion, Leonard Huxley is in an especially advantageous position. In these troubled days of renewed controversy, every student of biology should have access to such a well-written, compact biography as this.

Science News-Letter, August 6, 1927

THE HISTORY OF THE INCANDESCENT LAMP—John W. Howell and Henry Schroeder—*Maqua.* The fascinating story of how electricity was tamed to light our homes. Starting with the earliest attempts, the authors take us through Edison's work and finally to the researches of Coolidge and Langmuir that made possible the high power, high efficiency lamps of today.

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THE HUMAN BODY — Trevor Heaton—*Dutton* ($3). A non-technical readable physiology. One of those books that belong beside the family medicine chest.

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EVOLUTION OF PREVENTIVE MEDICINE—Sir Arthur Newsholme—*Williams and Wilkins* ($3). A much needed account of the development of preventive medicine up to the time of Pasteur.

Science News-Letter, August 6, 1927

MATHEMATICS AND THE BIOLOGICAL SCIENCES—H. B. Williams—*Nat. Res. Council* ($.25). A reprint of the Josiah Willard Gibbs Lecture for 1926.

Science News-Letter, August 6, 1927

ARCHÆOLOGY

Magic in Roman Life

By R. D. V. MAGOFFIN

Prof. Magoffin is president of the Archaeological Institute of America.

An investigation by a Washington University professor, Dr. Eugene Lavenner, has gathered together a great deal of material of interest on magic in early Roman religion.

The early Roman fathers of households had to go through a night ceremony at certain times, not of walking the floor with crying babies, but of walking against the intrusion of their dead ancestors. At midnight the Roman pater familias walked around in the house barefooted, snapping his fingers so that no spirit might surprise him while silent. Then after washing his hands, he put nine black beans in his mouth one at a time and threw them behind him repeating a certain formula as he threw each bean. Then he washed his hands again, struck a copper gong and repeated nine times, "Spirits of my ancestors, get you gone!" This is certainly all magic. So is the belief that a Vestal Virgin by saying a certain formula could make a runaway slave stop dead in his tracks—if he were still within the city limits—like a running rabbit at a whistle.

The sacrifice of red puppies to the spirit Robigus to avert red rust is certainly sympathetic magic. Clearly when an ancient Roman by using the exact formula could compel a god to do something, he was using magical powers. As the professor says, "this particular form of magic became the basis of Roman religion," that is to say, there grew the idea of a contractual relationship between man and the gods that assumed a vast importance in the development of Roman religion.

The ancient Roman endowed nearly everything about him with a numen or spirit. The priests used to drag a certain stone into Rome in case of a severe drought, and if the entire ceremony was carried out exactly and in due form, rain came, Numa, the second king of Rome, was nonplussed because of an excess of thunderstorms and lightning. He was instructed by the prophetic nymph Egeria to ask two gods to put a spell on Jupiter that would compel him to come down from heaven and show Numa how to control lightning. They chanted certain magic words and down Jupiter came. That was positive magic.

Taboo, on the other hand, was negative. The priest of Jupiter for example could not wear an unbroken ring; he could not have a knot in any article of his clothing; he could not have his hair cut or his hands manicured except by a free man; he could not touch a corpse or even mention raw meat, a she-goat, beans, or yeast bread. The ceremonial used to prevent Mars Silvanus from entering a birth chamber is a relic of early magic. After a child was born, three men representing gods went around the house during the night, striking the threshold with an ax, then a pestle, and then sweeping it with brooms. By using these instruments of civilization supposedly hateful to the old god of the woods, Silvanus was kept from entering the house.

The spirits of fertility and growth were the ones about whom the early Romans gave themselves the most concern. The many ways of avoiding the evil eye, the scores of ways to promote fertility, even the rite to avert mildew, all show that magic was a great element in early religion.

Science News-Letter, August 6, 1927

PHYSIOLOGICAL CHEMISTRY

Why Cod-liver Vitamins?

Chemists are trying to find out where codfish get the vitamins that made cod-liver oil famous.

Exposure to ultra-violet rays, which has been shown in the case of cows to increase the vitamin content in dairy products, does not work with fish, declares Charles E. Bills, research chemist, of Evansville, Ind., in a report in the *Journal of Biological Chemistry.* Fish subjected to five-minute exposures of ultra-violet irradiation every other day for six weeks produced oil that displayed more potency than that made from fish which had not been so treated.

During the period in which the Newfoundland codfish fattens, it gorges itself on small fish known as caplin which contain only a small amount of vitamin D. To account for the unusually high potency of cod-liver oil the cod would have to consume, within a period of four weeks, about 26 times its weight of caplin, a most unlikely quantity.

The presence of vitamin D in the liver of fish consequently is judged to be the result of chemical reactions in the body of the fish at present not clearly understood.

Science News-Letter, August 6, 1927

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In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. The key words used fit into any system of classification, whether it be a straight alphabetical file, a system of your own devising, the Library of Congress classification or the Dewey system.

Note that you can slip out any article without fear of damaging another article in which you might be interested, since editorial matter printed on the right-hand pages is backed by advertising, standing matter or a continuation of the article on the other side.

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GB Physical geography.
GC Oceanology and oceanography.
GF Anthropogeography.
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archæology.
GR Folklore.
GT Manners and customs.
GV Sports and amusements. Games.
HC Economic history and conditions. National production.
HD Economic history. Agriculture and Industries.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
HQ Family. Marriage. Woman.
HV Social pathology.
L Education.
M Music.
N Fine arts.
P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
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SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering. General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
TT Trades.
TX Domestic science.
U Military science. General.
V Naval science. General.

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020 Library economy
030 General cyclopedias
040 General collected essays
050 General periodicals
060 General societies
070 Newspapers
080 Special libraries. Polygraphy.
090 Book rarities
100 PHILOSOPHY—
110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
160 Logic
170 Ethics
180 Ancient philosophers
190 Modern philosophers
200 RELIGION—
210 Natural theology
220 Bible
230 Doctrinal. Dogmatics. Theology
240 Devotional. Practical
250 Homiletic. Pastoral. Parochial
260 Church. Institutions. Work
270 Religious history
280 Christian churches and sects
290 Ethnic. Non-Christian
300 SOCIOLOGY—
310 Statistics
320 Political science
330 Political economy
340 Law
350 Administration
360 Associations. Institutions
370 Education
380 Commerce. Communication
390 Customs. Costumes. Folklore
400 PHILOLOGY—
410 Comparative
420 English
430 German
440 French
450 Italian
460 Spanish
470 Latin
480 Greek
490 Minor Languages
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510 Mathematics
520 Astronomy
530 Physics
540 Chemistry
550 Geology
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730 Sculpture
740 Drawing. Decoration. Design
750 Painting
760 Engraving
770 Photography
780 Music
790 Amusement
800 LITERATURE—
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820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
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Anniversaries of Science

August 10, 1927—Watch for the Perseid meteors.

Science News-Letter, August 6, 1927

August 10, 1846—Congress passed the Act establishing the Smithsonian Institution.

The bequest, in the language of the testator, was, "*to found at Washington an establishment, under the name of the Smithsonian Institution, for the increase and diffusion of knowledge among men.*"

According to this, the Government of the United States is merely a trustee. The bequest is for the benefit of mankind, and any plan which does not recognize this provision of the will would be illiberal and unjust.

The institution must bear and perpetuate the name of its founder; and hence its operation ought to be kept distinct from those of the Government, and all the good which results from the expenditure of the fund should be accredited to the name of Smithson.

The object of the bequest is twofold: first, to *increase;* and second, to *diffuse* knowledge among men. These two objects are entirely distinct, and ought not to be confounded with one another. The first is to enlarge the existing stock of knowledge by the addition of new truths; and the second, to disseminate knowledge, thus enlarged, among men. The distinction is generally recognized by men of science, and in Europe different classes of scientific and other societies are founded upon it.

Again: the will makes no restriction in favor of any particular kind of knowledge, and hence all branches are entitled to a share of attention. Smithson was well aware that knowledge should not be viewed as existing in isolated parts, but as a whole, each portion of which throws light on all the other, and that the tendency of all is to improve the human mind, and to give it new sources of power and enjoyment. The most prevalent idea, however, in relation to the will, is that the money was intended exclusively for the diffusion of useful or immediately practical knowledge among the inhabitants of this country, but it contains nothing from which such an inference can be drawn. All knowledge is useful, and the higher the more important. From the enunciation of a single scientific truth may follow a hundred inventions, and the higher the truth the more important the deductions.

—Joseph Henry in address on the Smithsonian Institution published in 1854.

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August 11, 1877—Asaph Hall discovered Deimos, outer satellite of Mars.

At the opposition of Mars which occurred in August, 1877, the planet was unusually near the earth. Asaph Hall, then in charge of the 26-inch telescope at the Naval Observatory in Washington, took advantage of this favorable circumstance to make a careful search for a visible satellite of the planet. On the night of the 11th of August he found a faint object near the planet. Cloudy weather intervened, and the object was not again seen until the 16th, when it was found to be moving with the planet, leaving no doubt as to its being a satellite. On the night following an inner satellite much nearer the planet was observed. This discovery, apart from its intrinsic interest, is also noteworthy as the first of a series of discoveries of satellites of the outer planets. The satellites of Mars are difficult to observe, on account not merely of their faintness, but of their proximity to the planet, the light of which is so bright as to nearly blot out that of the satellite. Intrinsically the inner satellite is brighter than the outer one, but for the reason just mentioned it is more difficult to observe. The names given them by Hall were Deimos for the outer satellite and Phobos for the inner one, derived from the mythological horses that drew the chariot of the god Mars. . . . .

Owing to the minuteness of these bodies it is impossible to make any measures of their diameters. These can be inferred only from their brightness. Assuming them to be of the same color as Mars, Lowell estimates them to be about ten miles for Deimos and somewhat more for Phobos.

—Simon Newcomb: *Mars* in *Enc. Brit.*

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MEDICINE

May Adjust Glands

When a prima donna hurls her bouquet at her manager and says she cannot, cannot sing in the presence of such imbeciles, the temperamental outburst is probably due to some lack of adjustment in her various ductless glands.

Temperament is largely a matter of the balance of the glands of internal secretion, such as the thyroid, pituitary, and the reproductive glands, Prof. Julian Huxley, of the department of comparative anatomy at Oxford, told members of the British Science Guild in a recent lecture.

It may well be, he declared, that the applied physiology of the future will discover how to modify this factor. Many men of sedentary life who came back from the war with altered temperaments, he pointed out, had probably "discovered their adrenals." The violent activities into which they were forced made demands upon these and other glands that their previous life had never done. The glands responded by increased activity, setting up a new equilibrium, which seemed preferred by the body to the old. Consciously or unconsciously the lives of such men became adjusted so they continue on a different plane.

"We are sure to discover more and more of the means of playing on this complex system within us and eliciting from it the vital harmonies which we desire," Professor Huxley stated. "Efficiency after all is based on physiology."

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Xenon, a very rare gas, occurs in the atmosphere to the extent of .000009 per cent.

SEISMOLOGY

Two Quakes in Seven Years

The earthquake of May 22 in the Kansu province of China happening so soon after that of 1920 in the same region sets a new record. Never before in the knowledge of Commander N. H. Heck, in charge of the U. S. Coast and Geodetic Survey's earthquake investigations, have two such severe shakes in the same region occurred so close together. It was Commander Heck and his associates, using data gathered from seismograph observatories by Science Service, who located the position of the quake long before reports from the devastated area reached civilization.

In the quake of 1920, an estimated total of half a million people were killed, but according to reports from the region the casualties of the May earthquake numbered about 100,000. The 1920 quake was a little nearer to Peking, but other reasons are probably responsible for the lower loss of life in this latest one.

The Kansu province has been described as the "Wild West of China." Like our own wild west in the early days, it is a very unsettled region, and there have been frequent uprisings among the people of the region, who are largely Mohammedans. The last great uprising was in 1895, and since then the people have abandoned the cities in great numbers. Kulang, which is one of the cities reported as being destroyed, was described a few years ago by travelers, according to the National Geographic Society, as being nearly deserted and in ruins. Had the cities been as heavily populated as in past years, the loss of life would have been far greater, as the earthquake was one of the most severe on record.

It was across the Nan Shan Mountains, which lie near Thibet, that the May earthquake seems to have been most severe. A little distance to the north of the devastated region runs the famous Great Wall, which ends about 200 miles to the west of it. Practically through the region there ran in the past one of the great high roads into China. In recent times a railroad along the same route has been proposed. The great earthquakes do not necessarily mean that such a project is unsafe, however. Though the country contains geological evidence of earthquakes in the past, until 1920 none had occurred within historic times. Perhaps the shakes in 1920 and 1927 have relieved the strain of the region, and no more will occur for centuries.

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The Problem of Translation—

¶Science, probing the unknown universe, writes its findings in cryptic language. A stellar galaxy shining faintly in the heavens hides its splendor and its immensity in numbers and formulæ; a minute germ has thrust upon it a long Latin name. With the aid of such scientific shorthand and such technicalities, science pushes on to new discoveries and new heights.

¶Yet the facts and the methods of science must penetrate and permeate the whole fabric of civilization if the world is to become an increasingly better place to live in. The man in the street, the child in the school, the merchant in the counting house, the judge on the bench, the priest in the temple, all of those who make the world, must know, appreciate, understand and cherish the spirit of research and the power of thought.

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